InfiniScale® IV 36-Port QSFP InfiniBand Switch User Manual

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InfiniScale® IV 36-Port QSFP InfiniBand Switch User Manual

Document Number: 2983

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Revision History

Table 1 - Revision History Table

Date	Revision	Description
June 2009	Rev 2.0	Added Management module label and RS232 DB9 to DB9 harness Added part numbers for the two management modules.
June 2009	Rev 1.9	Made fixes to management section added Disassembly instructions
June 2009	Rev 1.8	Added Fabric IT section
April 2009	Rev 1.7	inserted procedure to replace the battery.
April 2009	Rev 1.6	Changes to installation kit and procedure
January 2009	Rev 1.5	added installation instructions added ECM Removed Watermark
November 2008	Rev 1.4	fixed weight in specs
October 2008	Rev 1.3	Minor Formatting changes.
September 2008	Rev 1.2	Added Reprogramming the MT3600 Through The I2C Port section. Added power cord OPNs to table 11 in Appendix D.
September 2008	Rev 1.1	Fixed link to Software package page.
September 2008	Rev 1.0	Initial release

About this Manual

This manual describes the installation and basic use of the Mellanox MTS3600 switch, which is based on the InfiniScale IV InfiniBand switch device.

Intended Audience

This manual is intended for users and system administrators responsible for installing and setting up the switch platforms listed above.

The manual assumes familiarity with the InfiniBand® Architecture Specification.

Related Documentation

Additional Documentation available from Mellanox:

Table 2 - Reference Documents

Switch Firmware and Firmware Update Tools	See http://www.mellanox.com > Downloads > Firmware Tools. Note that the Switch System described in this manual is based on Mellanox Technologies' InfiniScale® IV switch device.
Mellanox OFED Stack for Linux User's Manual	See http://www.mellanox.com > Downloads > InfiniBand SW/Drivers, Click "Mellanox OpenFabrics Enterprise Distribution for Linux (MLNX_OFED)" Select the Linux User's Manual The embedded OS and tools on the CPU in the management module is a subset of the Mellanox OFED stack.
FabricIT Enterprise Fabric Management Software CLI User's Manual	Talk to your Mellanox representative for information regarding licensing and implementation of the FabricIT Enterprise Fabric Management Software System.
Mellanox Firmware Tools (MFT) *User's Manual* *Document # 2329*	The MFT (Mellanox Firmware Tools) package is a set of firmware tools. The manual supplied with this package provides an overview of the firmware its installation and replacement. The MFT can be downloaded with its documentation at: http://www.mellanox.com > Downloads > Firmware Tools.

Conventions

Throughout this manual, the name MTS3600 and the term switch are used to describe both the 36-port 40Gb/s InfiniBand Switch and the 36-port QSFP 20Gb/s InfiniBand Switch, unless explicitly indicated otherwise.

Switch Products Covered in this User's Manual

Table 3 - Switch Products Covered by this User Manual

Product Number	Description
MTS3600Q-1BNC	36-port Managed QSFP 40Gb/s InfiniBand switch with one power supply
MTS3600R-1BNC	36-port Managed QSFP 20Gb/s InfiniBand switch with one power supply
MTS3600Q-1UNC	36-port Unmanaged QSFP 40Gb/s InfiniBand switch with one power supply
MTS3600Q-2UNC	36-port Unmanaged QSFP 40Gb/s InfiniBand switch with two power supplies
MTS3600R-1UNC	36-port Unmanaged QSFP 20Gb/s InfiniBand switch with one power supply
MTS3600R-2UNC	36-port Unmanaged QSFP 20Gb/s InfiniBand switch with two power supplies

Mellanox Part Numbering Legend

Table 4 - Part Numbering Legend

Place	Field	Decoder
MT	Mellanox Technologies	
S	System Type	S = Switch
MM	Model	36 = InfiniScale IV
FF	Form factor	00 = Rack mounted switch, 10 = Chassis
C	InfiniBand Port Config.	G = CX4 DDR, J = CX4 QDR, Q = QSFP QDR, R = QSFP DDR,
-	Separator	
P	# Power Supplies	0 = 0, 1 = 1, 2 = 2
M	Management	U = Unmanaged, A = Managed (Celeron), B = Managed (Freescale)
Y	Module Config.	N = IB modules
R	RoHS	C = RoHS w/ Exemption, R = RoHS Lead-Free

1 Overview

Mellanox MTS3600 switch systems provide the highest performing fabric solution by delivering high bandwidth and low latency to Enterprise Data Centers, High-Performance Computing and Embedded environments. Networks built with MTS3600 systems can carry converged traffic with the combination of assured bandwidth and granular quality of service. Built with Mellanox's 4th generation InfiniScale® IV InfiniBand switch device, MTS3600 systems provide up to 40Gb/s full bidirectional bandwidth per port. With 36 ports, these systems are among the densest switching systems available. These stand-alone switches are an ideal choice for top of-rack leaf connectivity or for building small to medium size clusters.

The switch comes pre-installed with all necessary firmware and is configured for standard operation within an InfiniBand fabric. This switch requires an InfiniBand compliant Subnet Manager running from one of the hosts. All that is required for normal operation is to follow the usual precautions for installation and to connect the switch to the HCAs. Once connected, the Subnet Management software automatically configures and begins utilizing the switch.

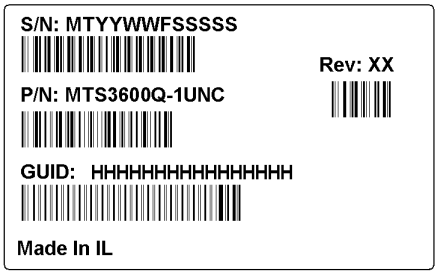
It is recommended that Mellanox OpenFabrics software package be installed on all nodes connected to the MTS3600. The software package provides a subnet manager and network management tools as well as connectivity software for servers and storage, and is available on the Mellanox web site. See Chapter 3 for more information.

Basic installation, hot-swapping components and hardware maintenance is covered in **"Installation and Basic Operation" on page 8**.

1.1 Serial Number and Product Version Information

The serial number and product version information are found on the label seen in the figure below.

Figure 1: Generic Product label



Also on this label is the GUID identifier for the switch. There is also a label with the MAC for the management module?

Figure 2: Management Module Label

2 Installation and Basic Operation

2.1 Switch Platform Hardware Overview

Figure 3 shows the power side panel and connector side panel views of the QSFP switch. The figure shows port configurations for the switch systems, including the dual hot-swap power supplies, and hot-swap fan module, I2C connector, RJ45 connector, USB connectors, VGA port connector, and various status LEDs.

Figure 3: QSFP Switch System Front and Back Panels

Front panel

Rear panel

All InfiniBand connectivity is via the connector side panel. All connectors can support active cables.

2.1.1 Status LEDs

2.1.1.1 System Status Indicators

The System Status Indicators are located just to the left of the primary power supply unit, and labeled “Sys.”.

The system status indicators should be as follows:

- When the switch is plugged in, within a few seconds the STATUS LED should light up green.
- The PSU 1 LED should light up green.
- The PSU 2 LED should light up green only if a second PSU is installed in the switch for redundancy and Hot-Swap ability. If only one PSU is installed in the switch, the PSU 2 LED will be off.
- The FAN LED should light up green.

If the STATUS LED shows red unplug the switch and call your Mellanox representative for assistance.

If the FAN LED shows yellow, trouble shoot the fan module.

Note: Do not run the switch for more than 2 minutes should the FAN LED show yellow.

If the PSU LEDs are not green, this indicates a problem with the power supplies. Do not run the switch if the PSU LEDs are not green.

Figure 4: Power and System LEDs

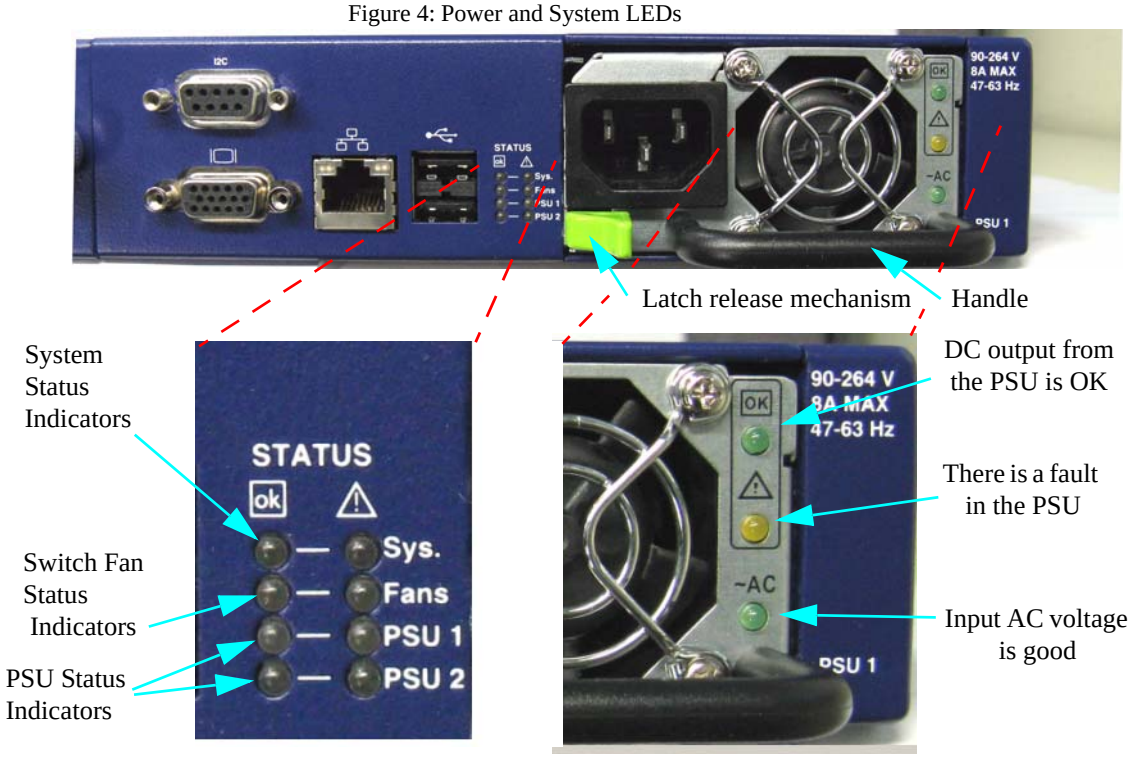
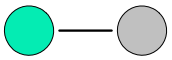
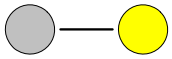
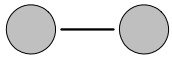


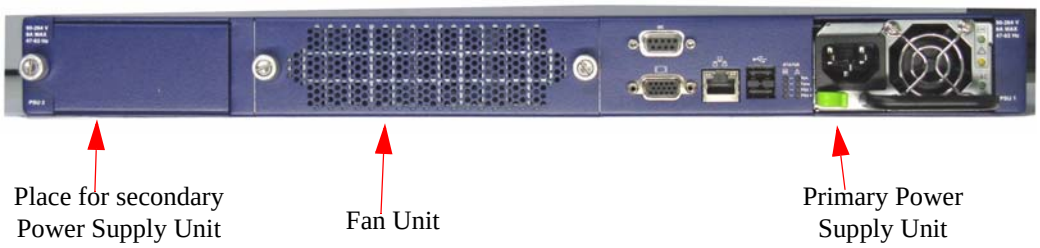
Table 5 - **System Status LED/ Configurations**

LED Configuration	Status
	OK – The system is up and running.
	Error –A fault in the system.
	Off – The system has no power.

2.1.1.2 Power Supply Status Indicators

The MTS3600 36 Port Switch is available with one or two factory installed Power Supply Units. For switches with only one unit installed, a second Power Supply Unit can be added to increase security, hot-swap ability and to add redundancy.

Figure 5: MTS3600 QSFP Front Panel



The primary power supply unit (PSU1) is located on the right side of the front panel, with PSU2 on the left side. Status indicators are located just to the left of where the primary power supply unit is located. Each PSU also has three status LEDs on the right side of the PSU, that indicate the internal status of the unit.

~AC– This LED when lit indicates input voltage between 90 and 264 Volts.

–This LED when lit indicates a fault in the power supply.

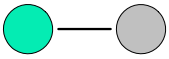
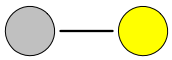
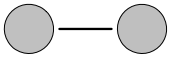
OK – This LED when lit indicates that the output from the power supply is +12VDC.

The PSU status indicators are located just to the left of the primary power supply unit, and labeled “PSU1” and “PSU2”. The following status conditions are possible:

2.1.1.3 Fan Status Indicators

The indicator labeled “Fans” is located just to the left of the primary power supply unit, next to PSU 1. The following fan status conditions are possible:

Table 6 - Fan Status LED Configurations

LED Configuration	Status
	OK – All fans are operating.
	Error – One or more fans is not operating. Repair or replace the fan unit.
	Off – The fan unit is not receiving any power. Check that the fan unit is properly and completely inserted.

All fans must be operating while the power supply is plugged in. Power must be removed within one minute of the fans failing, to prevent damage to the switch.

2.1.2 I^{2}C Connector

The MTS3600 supports an I2C compatible interface on the front panel.This interface is used to program firmware into the Flash Memory. Firmware can also be programmed in-band over the InfiniBand network. See Section 3 for more details.

2.1.3 Internal Management

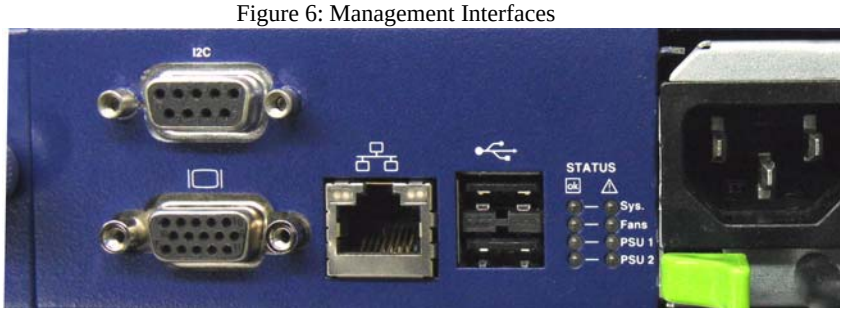
Internal management refers to a switch that has an internal PPC management board. Switches without this management board can be managed using an external management system. The following interfaces allow access to the internal management module. These interfaces have no function in externally managed systems.

2.1.4 Interfaces

There are five interfaces to connect to the MTS3600. They are:

- 1 I2C DB9 interface is labelled “I2C”. This interface can be used to access and modify the Flash and EEPROM.
- 1 RS232 connector is labelled . Use this connector to connect to the host PC.
- 2 USB ports is labelled . Use these to connect to a local keyboard and mouse.
- 1 video connector is labelled . Use this to connect to a local video monitor.

Figure 6: Management Interfaces



2.1.4.1 VGA Interface

The VGA port is for video output from the management module.

2.1.4.2 RS232 Interface

The RS232 connector interface is to be used to connect through the Ethernet to a remote host PC.

2.1.4.3 USB interface

There are two USB ports for connecting a keyboard and mouse for local management operation.

2.2 Switch Platform Installation and Operation

Installation and initialization of the switch platform are straightforward processes, requiring attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment.

The switch platform does not require any programming or configuration to operate as a basic InfiniBand switch and includes all of the necessary functionality to operate with external standard InfiniBand Subnet Management software.

An Internal Management option is available for the switch platform which includes InfiniBand Subnet Management software embedded internally in the switch. This section describes the installation process and basic operation of the switch platform. Please first read the warnings sub-section carefully before carrying on with installation procedures.

2.2.1 Installation Safety Warnings

For Safety Warnings in French see Section E,“de sécurité d’installation (French),” on page 34, and for German see Section F,“Installation - Sicherheitshinweise (German),” on page 36.

For Special Regulations Regarding Finland, Sweden, Denmark, and Norway see Section G,“Special Regulations Regarding Finland, Sweden, Denmark, and Norway,” on page 38.

1. Installation Instructions

Read all installation instructions before connecting the equipment to the power source.

2. Over-temperature

This equipment should not be operated in an area with an ambient temperature exceeding the maximum recommended: 45°C (113°F). Moreover, to guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.

3. Stacking the Chassis

The chassis should not be stacked on any other equipment. If the chassis falls, it can cause bodily injury and equipment damage.

4. Redundant Power Supply Connection - Electrical Hazard

This product includes a blank cover over the space for the redundant power supply. Do not operate the product if the blank cover is not securely fastened or if it is removed.

5. During Lightning - Electrical Hazard

During periods of lightning activity, do not work on the equipment or connect or disconnect cables.

6. Copper InfiniBand Cable Connecting/Disconnecting

Copper InfiniBand cables are heavy and not flexible, as such they should be carefully attached to or detached from the connectors. Refer to the cable manufacturer for special warnings and instructions.

7. Rack Mounting and Servicing

When this product is mounted or serviced in a rack, special precautions must be taken to ensure that the system remains stable. In general you should fill the rack with equipment starting from the bottom to the top.

8. Equipment Installation

This equipment should be installed, replaced, or serviced only by trained and qualified personnel.

9. Equipment Disposal

Disposal of this equipment should be in accordance to all national laws and regulations.

10. Local and National Electrical Codes

This equipment should be installed in compliance with local and national electrical codes.

11. Battery Replacement

There is a risk of explosion should the battery be replaced with a battery of an incorrect type.

Dispose of used batteries according to the instructions.

2.2.2 Mechanical Installation

The switch platform can be rack mounted and is designed for installation in a standard 19” rack. The power side of the switch includes a hot-swap power supply module, a blank cover for an optional second PSU for redundancy, a hot-swap fan tray, system LEDs, and management connection ports. The hot-swap fan module provides front to back air flow. The rear of the switch has the QSFP ports.

The switch platform contains auto-sensing 90 - 264 VAC connections for all possible PSUs.

The installer should use a rack capable of supporting the mechanical and environmental characteristics of a fully populated platform.

The rack mounting holes conform to the EIA-310 standard for 19-inch racks. Take precautions to guarantee proper ventilation for air intake at the power side of the chassis and exhaust at the connector side in order to maintain good airflow at ambient temperature. Cable routing in particular should not impede the air exhaust from the chassis.

2.2.2.1 Installing the Switch in the Rack

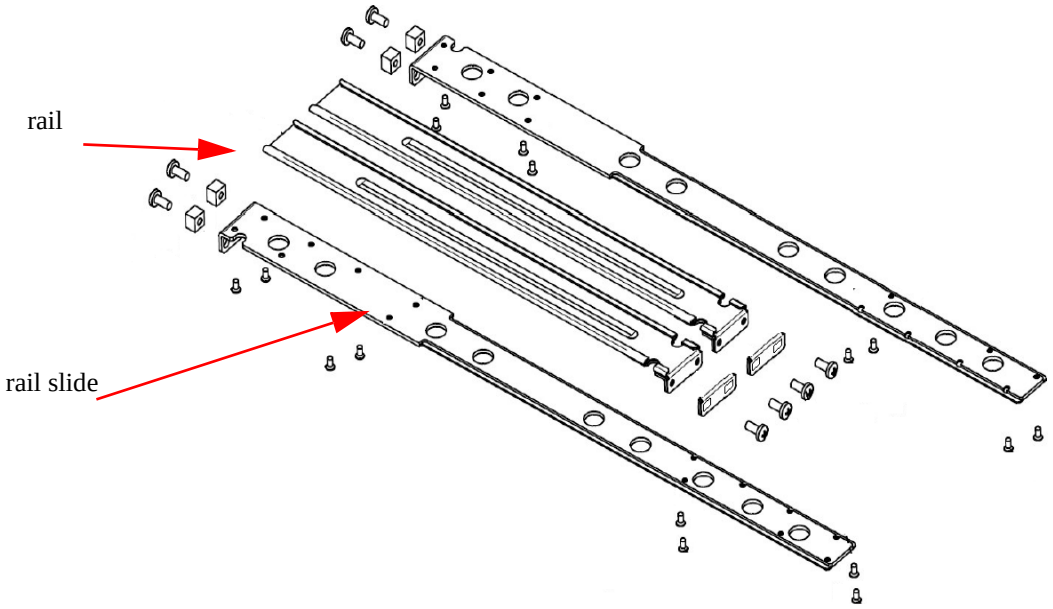
Tools needed:

- Phillips Screwdriver
- ESD Strap
- ESD mat

Parts included in the installation kit:

- 2 rails
- 2 rail slides
- 8 pan head screws M6
- 8 recessed flat head screws
- 4 caged nuts
- 2 metal washers

Figure 7: Rack Installation Kit Parts



Before you install your new MTS3600 switch, unpack the system and check to make sure that all the parts have been sent, check this against the parts list. Check the parts for visible damages that may have occurred during shipping.

Note: If anything is damaged or missing, contact your customer representative immediately.

Procedure

1. Place the ESD mat on the floor where you will be working and put on the ESD strap. Make sure the ESD strap is touching your skin and that the other end is connected to a verified ground.
2. Choose which side of the switch you want even with the vertical rack support. Either the side with the power supply units or the side with the IB connectors can be even with the vertical rack support. The other side of the switch will be further inside of the rack.

Things to consider before choosing where to mount the rails and rail slides.

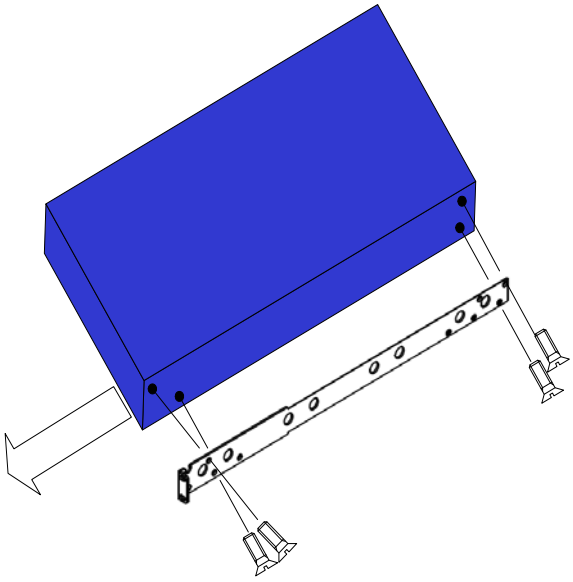
Figure 8: Which Side of the Rack Do You Want the Connectors?

The distance between the rack and the door can be as little as 4 cm on one side of the rack and as much as 18 cm on the other side of the rack. Keep in mind that there can be as many as 36 cables connected to the switch.

- Do you want the connector side recessed in the rack to allow for larger cable bending radius?
- Will the connector side be recessed past other equipment in the rack and will this be problematic?

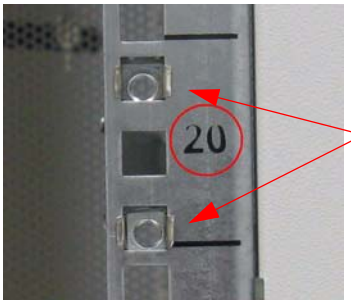
3. Install the rail slides onto the switch. Place the end of the rail slide with the 90^{o} angle on the side of the switch that you want to be even with the vertical support of the 19” rack. Use four of the flat head screws for each rail slide. There are two sets of holes in the rail slide. Select the set of holes to either mount the switch closer or farther away from the rack vertical support. Tighten the screws to 3Nm or 26.5 pound inches.

Figure 9: Screwing the Rail Slide onto the switch



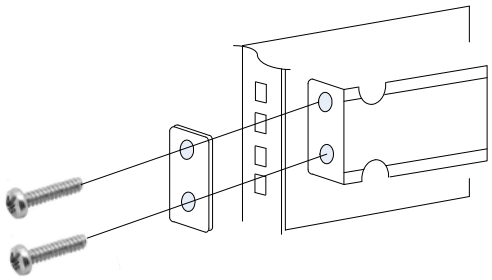
This side of the switch will be next to the vertical rack support.

4. Clip the nuts into the holes in the rack you will be using to connect the rail slides. Check that both sides of the switch are in the same position number on the rack.



5. Using two of the pan head screws and one washer, for each rail, install the rails to the other end of the rack. Place the rail behind the holes in the rack and screw the screws through the holes in the washer then through the rails. Tighten the pan head screws that hold the rails to 9.2 Nm or 81.5 pound inches.

Figure 10: Screwing in the Rails



6. Place the four bolts for the caged nuts within reach.
7. Slide the switch into the rails.
8. Put the switch into place and screw the bolts into the nuts from step 4. Tighten the bolts to 9.2 Nm or 81.5 pound inches.
9. Tighten all of the screws.
10. Plug in the power cables.
11. Check the Status LEDs and confirm that all of the LEDs show status lights consistent with normal operation.

Warning: Any yellow status LEDs is cause for concern and must be dealt with immediately.

12. You can start connecting all of the cables to the switch.

2.2.3 Power Connections and Initial Power On

The switch platform ships with one or two Power Supply Units. For switches with only one unit installed, a second PSU may be installed at a later time. Each supply has a separate AC receptacle. The input voltage is

auto-adjusting for 90-264 VAC, 47-63Hz power connections. The power cords should be standard 3-wire AC power cords including a safety ground and rated for 15A or higher.

Caution: The switch platform will automatically power on when AC power is applied. There is no power switch. Check all boards, power supplies, and fan tray modules for proper insertion before plugging in a power cable.

Caution: After inserting a power cable and confirming the green system status LED light is on; make sure that the Fan Status indicator shows green.

If the fan status indicator is not green then unplug the power connection and check that the fan module is inserted properly and that the mating connector of the fan unit is free of any dirt and/or obstacles.

Caution: When turning off the switch, make sure **ALL LEDS** are off to ensure a powered down status.

Note: Do not hot swap the power supply if your switch has only one power supply. You must power down the system to replace the power supply unit when there is only one PSU in the switch.

Figure 11: Two Power Inlets - Electric Caution Notifications

CAUTION	**ACHTUNG**	**ATTENTION**
Risk of electric shock and energy hazard. The two PSUs are independent. Disconnect all power supplies to ensure a powered down state inside of the switch platform.	Gafahr des elektrischen Schocks. Entferrnen des Netzsteckers elnes Netzteils spannungsfrei. Um alle Einhieten spannungsfrei zu machen sind die Netzstecker aller Netzteile zu entfernen	Risque de choc et de danger e’lectriques. Le de’branchment d’une seule alimentation stabilise’e ne de’branch uniquement qu’un module “Alimentation Stabilise’e”. Pour isoler completement le module en cause, Il faut de’brancher toutes les alimentations stabilise’es.

2.2.4 Extracting and Inserting the Power Supply Unit

With both power supplies installed in the redundant configuration, either PSU may be extracted without bringing down the system.

Note: Make sure that the PSU that you are NOT replacing is showing all green, for both the PSU and status indicators.

Figure 12: Power Supply Unit Extraction

To extract a PSU:

1. Remove the power cord from the power supply unit.
2. Grasping the handle with your right hand, push the latch release with your thumb while pulling the handle outward. As the PSU unseats, the PSU status indicators will turn off.
3. Remove the PSU.

To insert a PSU:

1. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.
2. Insert the PSU by sliding it into the opening until a slight resistance is felt.
3. Continue pressing the PSU until it seats completely. The latch will snap into place confirming the proper installation.
4. Insert the power cord into the supply connector.

Note: The green PSU indicator should light and the yellow indicator should remain off. If not, extract the PSU and re-insert it.

2.2.5 InfiniBand Cable Installation

All cables can be inserted or removed with the unit powered on. To insert a cable, press the connector into the port receptacle until the connector is firmly seated. The GREEN LED indicator, corresponding to each QSFP port, will light when the physical connection is established (that is, when the unit is powered on and a cable is plugged into the port with the other end of the connector plugged into a functioning port). After plugging in a cable, lock the connector using the latching mechanism particular to the cable vendor. When a logical connection is made the yellow light will come on. When data is being transferred the yellow light will blink.

Note: Cables in the bottom row should be inserted up side down in relation to the how the cables are inserted in the top row.

To remove, disengage the locks and slowly pull the connector away from the port receptacle. Both LED indicators will turn off when the cable is unseated.

Care should be taken not to impede the air exhaust flow through the ventilation holes next to the InfiniBand ports. Cable lengths should be used which allow for routing horizontally around to the side of the chassis before bending upward or downward in the rack.

Figure 13: Cable connections to the Switch

2.2.6 Extracting and Inserting the Fan Unit

This switch can operate indefinitely with one of the three fans in the fan module inoperable so long as the ambient temperature is below 45° Celsius.

Operation without a fan unit should not exceed one minute.

During fan hot-swap, if both indicators are OFF then the fan unit is disconnected.

To extract a Fan Unit:

1. Loosen the two thumb screws locking the fan tray in place.
   One of the fan status indicators (either green or yellow) will remain on.
2. Pull the fan unit out by pulling on the thumbscrews. As the fan unseats, the fan status indicator will turn off.

To insert a FAN Unit:

1. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.

2. Insert the fan unit by sliding it into the opening until slight resistance is felt. Continue pressing the fan unit until it seats completely.
3. Turn the two thumb screws to lock the fan unit in place.

Note: The green fan status indicator should light and the yellow fan status should remain off. If not, extract the fan unit and reinsert it. After two unsuccessful attempts to install the fan unit, power off the switch before attempting any system debug.

2.2.7 Replacing the Battery in the Management Module

The battery is only used for the clock within the management module. If the Battery is dead the time on the management module will not be updated. The battery is a lithium 3V CR2032.

To replace the battery by:

1. Unplug all of the power chords and connectors from the switch.
2. Remove the switch from the rack.
3. Put on an ESD strap and ground the strap to a valid ground.
4. Remove the rail slides from the switch. Put aside the rail slides and screws for later use.
5. Remove the cover from the switch and put the cover and screws aside for later use.
6. Remove the battery from the holder. It is found near the front of the switch next to PSU1.
7. Insert the new battery + side up.

8. Replace the top cover using the screws set aside in step 5.
9. Reinstall the rail slides using the screws set aside in step 4.
10. Reinstall the switch in the rack.
11. Plug in the power cords and connectors.

2.3 Disassembly of the Switch from the Rack

To disassemble the switch from the rack:

1. Unplug and remove all connectors.
2. Unplug all power cords.
3. Unscrew the 4 bolts from the side of the switch with the rail slides. See Figure 7,“Rack Installation Kit Parts” for a picture of the rail slides.

Note: Support the weight of the switch when you remove the screws so that the switch does not fall.

4. Slide the switch from the rack.
5. Remove the rails from the rack.

6. Remove the eight caged nuts.

2.4 Disposal

According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste.

Dispose of this product and all of its parts in a responsible and environmentally friendly way.

3 Management and Tools Overview

3.1 Network Management and Clustering Software

Download and install on all nodes the Mellanox OpenFabric software package for Linux, Windows, or other operating systems from the Mellanox software website:

http://www.mellanox.com.> Downloads > InfiniBand SW/Drivers.

This software package provides connectivity for server and storage systems utilizing High Performance Computing (HPC) or enterprise data center (EDC) applications across an InfiniBand fabric. It also provides a subnet manager for simple network configuration and network administration and diagnostic tools for network management.

3.2 Internally Managed Switch System

The switch system comes with a PPC controlled management module. The management module for this switch system runs SW that can manage the chassis. An option to upgrade the management module to be able to manage the whole fabric is available. See your Mellanox representative for information and pricing regarding this upgrade.

The managed Switch system includes a CPU which contains:

- Embedded OS, secure In-band, out-band access
- Chassis manager & System BIST
- SNMP Agent, 3rd Party tool integration
- CLI and GUI
- Subnet manager
- Performance/provisioning manager
- Congestion & notification manager
- QoS manager
- Adaptive routing manager
- Cluster diagnostics manager

Management modules with a CPU will have the capability to allow remote monitoring and remote management of the chassis from any host connected to the fabric.

The Subnet management features include:

- upgrading Drivers
- upgrading software
- monitoring of:
  - AC power to the PSUs
  - DC power out from the PSUs
  - board temperature
  - spine fan module unit
  - leaf fan module unit

  - failure in the switch system
  - system failure in the switch system
- querying for board serial numbers and their revisions

In addition, the tools enable firmware management capabilities such as:

- querying for existing firmware versions
- burning new firmware (from scratch or for recovery from damaged firmware)
- querying for and changing system GUIDs
- checking for duplicate or bad GUIDs

3.2.1 Initializing the switch for the first time

See FabricIT EFM user manual Section 3.1.

3.2.2 Accessing the Switch Locally

For local access out of band management of the switch system use one of the two procedures below.

3.2.2.1 Accessing the CPU via a host PC

Hook up a cable from the RS232 connector is labelled to a host PC either using a USB connector or an RJ45 connector on the host PC side.

3.2.2.2 Accessing the CPU via Keyboard, Video, Mouse (KVM)

1. Connect a keyboard to the one of the USB ports, a video device to the video connector, and a mouse to the second USB connector of the switch (cables not supplied).
2. Login using the following user name and password.

   User Name: admin
   Password: password

Note: User name and password are case sensitive.

3. Change the default user name and password.

3.2.3 Starting a Remote Connection to the Switch

See FabricIT EFM user manual Section 4.

3.2.3.1 Accessing the CPU via the Ethernet Connector

Once the initial configuration is completed the management tools can be accessed through:

- SSH
- Telnet
- the WEB

3.2.4 Downloading Firmware

Firmware for this switch system can be found at and downloaded from:
http://www.mellanox.com > Downloads > Firmware.

Be sure to read and follow all of the instructions regarding the updating of the firmware on your switch system. Firmware for the HCA cards connected to this switch system can be downloaded from the same site.

4 Switch Management Tools

This chapter describes the management module tools. This management module allows the switch to be managed either locally or remotely. The switch can also be managed using Out-of-Band management of the switch via FabricIT EFM. The standard switch comes with a management module that will completely manage your switch. An optional management module is available that is more robust and can manage a whole fabric.

4.1 FabricIT

FabricIT EFM is a software based management system that can be run with either a command line interface or with a GUI interface. The GUI interface can be run through the Web. A license is required for full use of FabricIT. The standard management module, without a license, allows for managing the switch using only a small subset of the commands available within FabricIT EFM. Make sure to register your FabricIT license to enable all of the available commands and functions.

See the FabricIT EFM User Manual for instructions and commands available to manage the switches, and fabric.

5 Troubleshooting

As soon as a switch is plugged in make sure that the green power LEDs on the PSUs are on.

Status LED and or Status Health LED

If either of these two LEDs is **red** unplug the switch and call your Mellanox representative.

Power supply unit:

1. If the ~AC power LED is off, check that the power cable is plugged into a working outlet. Check that the power cable has a voltage within the range of 90 - 264 volts AC.
2. If the LED on the PSU is not lit or is red.
3. Remove and reinstall the power cable.
4. If the ~AC power LED is green but the OK power LED is off or the LED is on – Replace the PSU.

The Status green power LED for PSU1 or PSU2 does not come on:

1. If the OK LED on the PSU is on but the system LED is off remove and reinstall the PSU. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.
2. If the OK LED on the PSU is off, check that OK LED on the PSU Unit is on.
3. Remove and reinstall the power cable. Check that the power outlet (in the wall) is working.
4. Remove and reinstall the PSU. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.
5. Replace the PSU.

The power LED for the switch shuts off:

1. Check that the there is adequate ventilation.
2. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
3. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.

The green power LED for the fans does not come on:

1. Check that the Power LEDs are on.
2. Remove and reinstall the fan unit. Make sure the mating connector of the new unit is free of any dirt and/or obstacles. See Section 2.2.6, “Extracting and Inserting the Fan Unit,” on page 19.

Caution: Do not run the switch if the System Status LED for the Fans is Yellow!

The link LED for the InfiniBand connector does not come on:

1. Check that both ends of the cable are connected.
2. Check that the locks on the ends are secured.

3. Make sure that the latest FW version is installed on both the HCA and the switch.
4. If media adapters are used, check that the all connections are good, tight, and secure.

The activity LED does not come on:

Check that the Subnet Manager has been started.

Appendix A: Specification

Table 7 - MTS3600Q Specification Data

Physical		**Power and Environmental**	
Size:	1.73” (1U) H x 17.5” W x23.8” D 44mm X 444mm X 605mm	Input Voltage: Power Consumption:	90 - 264 VAC 47-63Hz 326W Dissipated Power: 200W Power through connector:126W
Weight:	22.045 lbs. 1 PSU 24.60 lbs. 2 PSUs		
Mounting:	19” Rack mount		
Air Flow:	70.5CFM	Temperature: Humidity:	10° to 45° Celsius 10% - 90% non-condensing
SerDes Speeds:	10, 20, or 40,Gb/s per port	Shock and Vibration:	ETSI EN 300 019-2-2: 1999-09
Connector Types:	QSFP		
Protocol Support		**Regulatory Compliance**	
InfiniBand:	Auto-Negotiation of (40Gb/s, 20Gb/s, 10Gb/s)	Safety:	US/Canada: cTUVus EU: IEC60950 International: CB
QoS:	8 InfiniBand Virtual Lanes for all ports		
Management:	Baseboard, Performance, and Device management Agents for full InfiniBand In-Band Management	EMC (Emissions):	USA: FCC, Class A Canada: ICES, Class A EU: EN55022, Class A EU: EN55024, Class A EU: EN61000-3-2, Class A EU: EN61000-3-3, Class A Japan: VCCI, Class A
Data Rate:	QDR		
		Environmental:	EU: IEC 60068-2-64: Random Vibration EU: IEC 60068-2-29: Shocks, Type I / II EU: IEC 60068-2-32: Fall Test
		Acoustic: Sound power level:	ISO 7779 ETS 300 753 70.5 dB(A) or 7.1 Bel
Scalability and Performance		**Reliability, Availability and Serviceability Features**	
Switching Performance:	Simultaneous wire-speed any port to any port		
Addressing:	48K Unicast Addresses Max. per Subnet 16K Multicast Addresses per Subnet	Hot-Swappable: 1+1 Redundant:	Fan Module and Power Supplies Power Supplies
Switching Capacity:	2.88Tb/s		

Table 8 - MTS3600R Specification Data

Physical		**Power and Environmental**	
Size:	1.73” (1U) H x 17.5” W x23.8” D 44mm X 444mm X 605mm	Input Voltage: Power Consumption:	90 - 264 VAC 47-63Hz 316W Dissipated Power: 190W Power through connector:126W
Weight:	22.045 lbs. 1 PSU 24.60 lbs. 2 PSUs		
Mounting:	19” Rack mount		
		Temperature:	10° to 45° Celsius
Air Flow:	70.5 CFM	Humidity:	10% - 90% non-condensing
SerDes Speeds:	10 or 20 Gb/s per port	Shock and Vibration:	ETSI EN 300 019-2-2: 1999-09
Connector Types:	QSFP		
Protocol Support		**Regulatory Compliance**	
InfiniBand:	Auto-Negotiation of (20Gb/s or 10Gb/s)	Safety	US/Canada: cTUVus EU: IEC60950 International: CB
QoS:	8 InfiniBand Virtual Lanes for all ports		
Management:	Baseboard, Performance, and Device management Agents for full InfiniBand In-Band Management	EMC (Emissions)	USA: FCC, Class A Canada: ICES, Class A EU: EN55022, Class A EU: EN55024, Class A EU: EN61000-3-2, Class A EU: EN61000-3-3, Class A Japan: VCCI, Class A
Data Rate:	DDR		
		Environmental	EU: IEC 60068-2-64: Random Vibration EU: IEC 60068-2-29: Shocks, Type I / II EU: IEC 60068-2-32: Fall Test
		Acoustic	ISO 7779 ETS 300 753
		Sound power level:	70.5 dB(A) or 7.1 Bel
Scalability and Performance		**Reliability, Availability and Serviceability Features**	
Switching Performance:	Simultaneous wire-speed any port to any port		
		Hot-Swappable:	Fan Module and Power Supplies
Addressing:	48K Unicast Addresses Max. per Subnet 16K Multicast Addresses per Subnet	1+1 Redundant:	Power Supplies
Switching Capacity:	1.44Tb/s		

A.1 EMC Certification Statements

Table 9 lists the approved certification status per switch in different regions of the world

Table 9 - Switch Certification Status

Switch P/N	FCC Class (USA)	EN Class (Europe)	ICES Class (Canada)	VCCI (Japan)	cTUVus	CB
MTS3600R-1UNC	A	A	A	A	✓	✓
MTS3600Q-1UNC	A	A	A	A	✓	✓
MTS3600R-1BNC	A	A	A	A	✓	✓
MTS3600Q-1BNC	A	A	A	A	✓	✓

A.1.1 FCC Statements (USA)

Class A Statements:

§ 15.21

Statement

Warning! Changes or modifications to this equipment not expressly approved by the party responsible for compliance (Mellanox Technologies) could void the user's authority to operate the equipment.

§15.105(a)

Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

A.1.2 EN Statements (Europe)

EN55022 Class A Statement:

> **Warning**
>
> This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

A.1.3 ICES Statements (Canada)

Class A Statement:

“This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.”

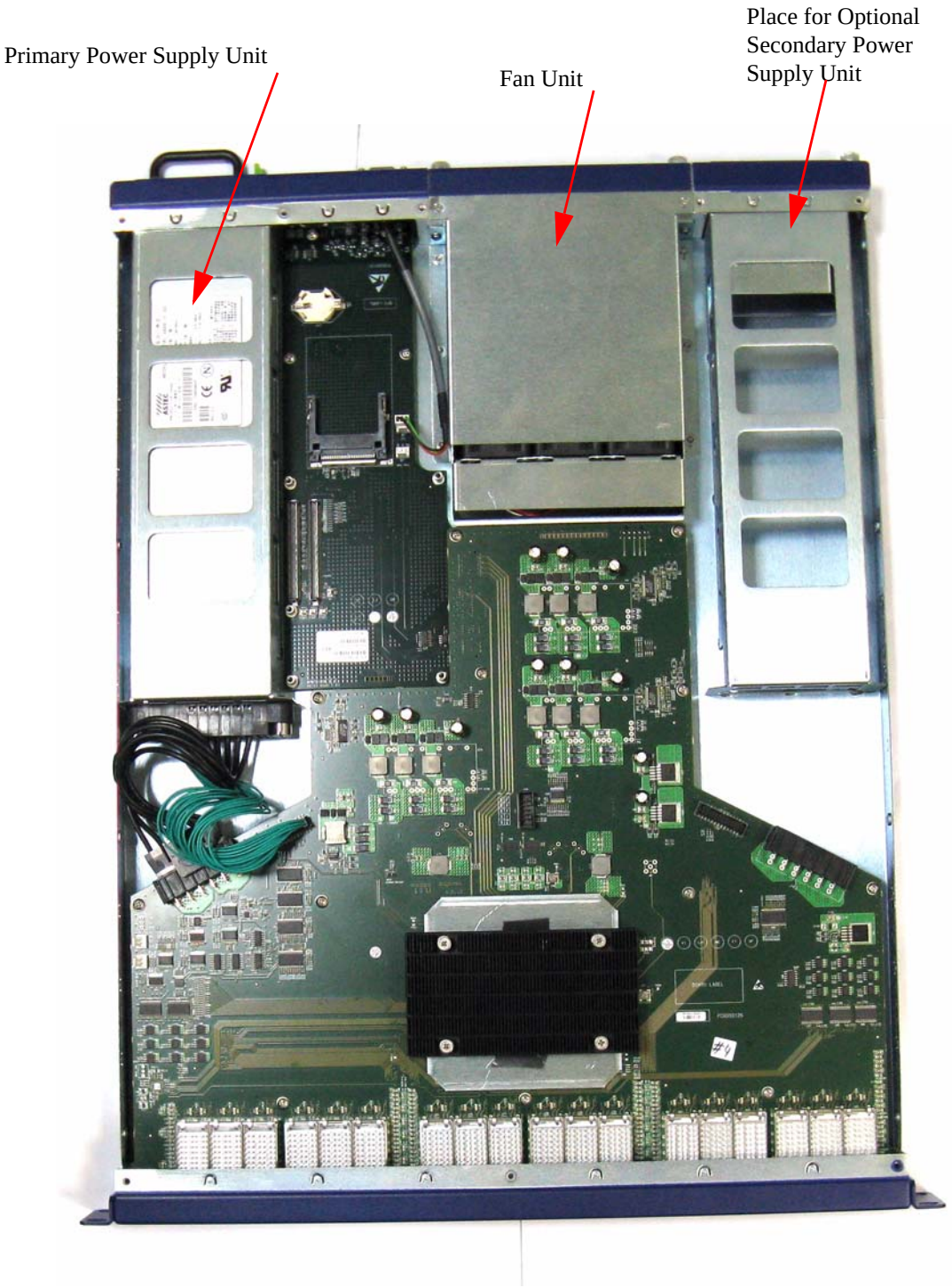
A.1.4 VCCI Statements (Japan)

Class A Statement:

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

0.0.1 (Translation - "This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.")

Appendix B: Switch Hardware Components



Appendix C: QSFP Interface

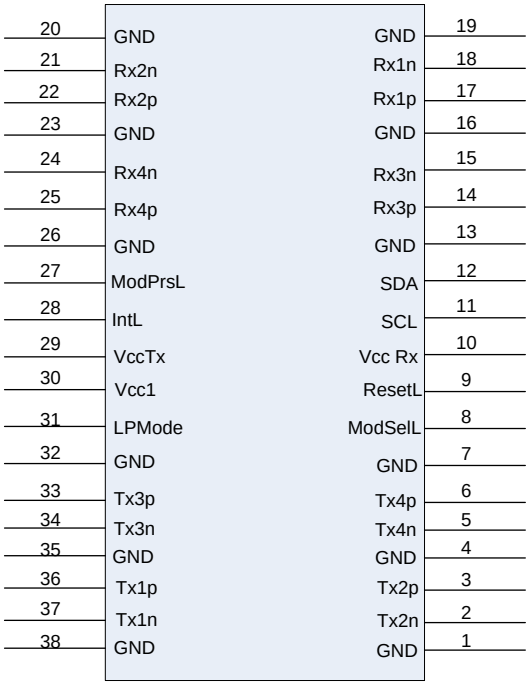


Table 10 - InfiniBand QSFP Connector Pinout

Connector Pin Number	Connector Pin Name	Signal Description
1	GND	Ground
2	Tx2n	Transmitter Inverted Data Input
3	Tx2p	Transmitter Non-Inverted Data Input
4	GND	Ground
5	Tx4n	Transmitter Inverted Data Input
6	Tx4p	Transmitter Non-Inverted Data Input
7	GND	Ground
8	ModSelL	Module Select
9	ResetL	Module Reset
10	Vcc Rx	+3.3 V Power supply receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial interface data
13	GND	Ground
14	Rx3p	Receiver Non-Inverted Data Output
15	Rx3n	Receiver Inverted Data Output
16	GND	Ground
17	Rx1p	Receiver Non-Inverted Data Output
18	Rx1n	Receiver Inverted Data Output
19	GND	Ground
20	GND	Ground
21	Rx2n	Receiver Inverted Data Output 3
22	Rx2p	Receiver Non-Inverted Data Output 3
23	GND	Ground
24	Rx4n	Receiver Inverted Data Output 3
25	Rx4p	Receiver Non-Inverted Data Output 3
26	GND	Ground
27	ModPrsL	Module Present
28	IntL	Interrupt
29	Vcc Tx	+3.3 V Power supply transmitter
30	Vcc 1	+3.3 V Power Supply
31	LPMode	Low Power Mode
32	GND	Ground
33	Tx3p	Transmitter Non-Inverted Data Input
34	Tx3n	Transmitter Inverted Data Input
35	GND	Ground
36	Tx1p	Transmitter Non-Inverted Data Input
37	Tx1n	Transmitter Inverted Data Input
38	GND	Ground

Appendix D: Replacement Parts Ordering Numbers

Table 11 - Replacement Parts Ordering Numbers

Part Description	OPN
Power Supply Unit PSU This Replacement part is for both the PSU 1 and PSU 2.	MTP000018
Power supply blank	MTM003600
Rack installation kit	MTR003600
Fan Unit for QSFP	MTF000960
Management module 405 PPC	SA000102
Management module upgrade to 460 PPC	SA000102
RS232 CABLE - DB9 TO DB9 HARNESS	HAR000040
Power cord Type B for USA, Canada, Mexico, Taiwan	ACC000204
Power cord Type H for Israel	ACC000205
Power cord Type E/F for Sweden, France, Germany, Netherlands, Russia	ACC000207
Power cord Type G for UK	ACC000208
Power cord Type D for India	ACC000209
Power cord Type I for China	ACC000210
Power cord Type J for Switzerland	ACC000211
Power cord Type B for Japan,	ACC000212
Power cord Type I for Australia	ACC000213

Appendix E: de sécurité d'installation (French)

1. Instructions d'installation

Lisez toutes les instructions d'installation avant de brancher le matériel à la source d'alimentation électrique.

2. Température excessive

Ce matériel ne doit pas fonctionner dans une zone avec une température ambiante dépassant le maximum recommandé de 45°C (113°F). En outre, pour garantir un bon écoulement de l'air, laissez au moins 8 cm (3 pouces) d'espace libre autour des ouvertures de ventilation.

3. Empilage du châssis

Le châssis ne doit pas être empilé sur un autre matériel. Si le châssis tombe, il peut provoquer des blessures corporelles et des dégradations de biens.

4. Connection d'Alimentation electrique excedentaire -dangers électriques

Ce produit comporte un couvercle transparent sur l'espace pour l'alimentation électrique redondante.
Ne pas faire fonctionner le produit si le couvercle transparent n'est pas solidement fixé ou s'il est enlevé.

5. Orages – dangers électriques

Pendant un orage, il ne faut pas utiliser le matériel et il ne faut pas brancher ou débrancher les câbles.

6. Branchement/débranchement des câbles InfiniBand en cuivre

Les câbles InfiniBand en cuivre sont lourds et ne sont pas flexibles, il faut donc faire très attention en les branchant et en les débranchant des connecteurs. Consultez le fabricant des câbles pour connaître les mises en garde et les instructions spéciales.

7. Montage et entretien sur baie

Lorsque ce produit est monté ou entretenu sur baie, il faut prendre des précautions spéciales pour s'assurer que le système reste stable. En général, il faut remplir la baie avec du matériel de bas en haut.

8. Installation du matériel

Ce matériel ne doit être installé, remplacé ou entretenu que par du personnel formé et qualifié.

9. Elimination du matériel

L'élimination de ce matériel doit s'effectuer dans le respect de toutes les législations et réglementations nationales en vigueur.

10. Codes électriques locaux et nationaux

Ce matériel doit être installé dans le respect des codes électriques locaux et nationaux.

Appendix F: Installation - Sicherheitshinweise (German)

1. Installationsanleitungen

Lesen Sie alle Installationsanleitungen, bevor Sie das Gerät an die Stromversorgung anschließen.

2. Übertemperatur

Dieses Gerät sollte nicht in einem Bereich mit einer Umgebungstemperatur über der maximal empfohlenen Temperatur von 45°C (113°F) betrieben werden. Außerdem sollten mindestens 8 cm (3 in.) Freiraum um die Belüftungsöffnungen sein, um einen einwandfreien Luftstrom zu gewährleisten.

3. Stapeln des Chassis

Das Chassis sollte nicht auf andere Geräte gestapelt werden. Wenn das Chassis herunterfällt, kann es zu Verletzungen und Beschädigungen an Geräten führen.

4. Redundanter Stromversorgungsanschluss - Elektrische Gefahr

Dieses Produkt verfügt über eine Abdeckung über dem Bereich für die redundante Stromversorgung. Betreiben Sie das Produkt nicht, wenn diese Abdeckung nicht sicher festsitzt oder entfernt wurde.

5. Bei Gewitter - Elektrische Gefahr

Arbeiten Sie während eines Gewitters und Blitzschlag nicht am Gerät, schließen Sie keine Kabel an oder ab.

6. Anschließen/Trennen von InfiniBand-Kupferkabel

InfiniBand-Kupferkabel sind schwer und nicht flexible. Deshalb müssen sie vorsichtig an die Anschlüsse angebracht bzw. davon getrennt werden. Lesen Sie die speziellen Warnungen und Anleitungen des Kabelherstellers.

7. Rack-Montage und Wartung

Wenn dieses Produkt in einem Rack montiert oder gewartet wird, sind besondere Vorsichtsmaßnahmen zu ergreifen, um die Stabilität des Systems zu gewährleisten. Im Allgemeinen sollten Sie das Gestell von unten nach oben mit Geräten füllen.

8. Geräteinstallation

Diese Gerät sollte nur von geschultem und qualifiziertem Personal installiert, ausgetauscht oder gewartet werden.

9. Geräteentsorgung

Die Entsorgung dieses Geräts sollte unter Beachtung aller nationalen Gesetze Bestimmungen erfolgen.

10. Regionale und nationale elektrische Bestimmungen

Dieses Gerät sollte unter Beachtung der regionalen und nationalen elektrischen Bestimmungen installiert werden.

Appendix G: Special Regulations Regarding Finland, Sweden, Denmark, and Norway

Denmark- This unit is class I and must be connected with an AC cord compliant with all national electrical codes in Denmark. The AC cord shall have an integral ground wire, and can only be plugged into a fully grounded outlet.

Do not connect this unit to any outlet that is not fully grounded!

- **Finland** -

"Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan"

- **Norway** -

"Apparatet må tilkoples jordet stikkontakt"

Unit is intended for connection to IT power systems for Norway only.

- **Sweden** -

"Apparaten skall anslutas till jordat uttag."